



Amendments to the Claims

Claims 1-162 (cancelled)

Claim 163. (currently amended): A parallel reactor for simultaneously processing a plurality of reaction mixtures, said reactor comprising

vessels for containing the reaction mixtures, and

5 multi-piece spindles for stirring the reaction mixtures in the vessels, each multi-piece spindle comprising a metal upper spindle portion, a plastic stirrer comprising a plastic shaft and a plastic mixing blade on the shaft, and a coupling for releasably coupling the plastic stirrer to the metal upper  
10 spindle portion in a position wherein the stirrer extends down into a respective vessel,

21 said plastic stirrer being removable from said coupling after a mixing operation to permit replacement of the stirrer.

Claim 164. (currently amended): A parallel reactor as set forth in claim 163 wherein said stirrer is of a chemically resistant plastic material ~~and comprises a shaft and mixing blade on the shaft.~~

Claim 165. (previously added): A parallel reactor as set forth in claim 164 wherein said coupling is attached to the upper spindle portion, and wherein said shaft of the stirrer has a quick-connect/disconnect element thereon adapted for  
5 releasable engagement with said coupling.

Claim 166. (previously added): A parallel reactor as set forth in claim 165 wherein said quick-connect/disconnect element comprises a circumferential groove around said shaft for receiving one or more detents in the coupling.

Claim 167. (previously added): A parallel reactor as set forth in claim 163 further comprising a drive system for rotating the multi-piece spindles to mix the contents of the vessels.

Claim 168. (previously added): A parallel reactor as set forth in claim 167 wherein said drive system comprises a drive mechanism located external to the vessels, and magnetic feed through devices for magnetically coupling the drive mechanism to  
5 the upper spindle portions of the multi-piece spindles.

Claim 169. (previously added): A parallel reactor as set forth in claim 168 wherein said drive mechanism comprises a gear train for rotating each magnetic feed through device, and a motor for rotating gears of the gear train to effect conjoint  
5 rotation of the multi-piece spindles at speeds up to 3000 rpm.

Claim 170. (previously added): A parallel reactor as set forth in claim 169 wherein each vessel has as volume of less than about 500 ml.

Claim 171. (currently amended): Plastic stirrers for use in stirring reaction mixtures in a parallel reactor, said reactor comprising vessels for containing said reaction mixtures, metal spindle portions associated with the vessels,  
5 couplings on the metal spindle portions for releasably coupling the plastic stirrers to the spindle portions in positions wherein the stirrers extend down into the vessels, and a drive system for rotating the metal spindle portions and the plastic stirrers coupled thereto thereby to mix the contents of the  
10 vessels, each plastic stirrer comprising a plastic shaft and a plastic mixing blade on the shaft, said shaft having a quick-connect/disconnect element thereon adapted for engagement with

15 said coupling for releasably coupling the plastic stirrer to the metal spindle portion for rotation therewith whereby upon completion of a mixing operation the plastic stirrer is adapted to be disconnected from said coupling and replaced by a new plastic stirrer.

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Claim 172. (previously added): Plastic stirrers as set forth in claim 171 wherein said quick-connect/disconnect element comprises a circumferential groove in said shaft adapted for receiving one or more detents in the coupling.

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Claim 173. (previously added): Plastic stirrers as set forth in claim 172 wherein said quick-connect/disconnect element comprises a pin on said shaft receivable in a bayonet slot in said coupling.

Claim 174. (previously added): Plastic stirrers as set forth in claim 171 wherein each stirrer is sized for reception in a vessel having a volume of less than 500 ml.

Claim 175. (previously added): Plastic stirrers as set forth in claim 174 wherein each stirrer is sized for reception in a vessel having a volume of less than 20 ml.

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Claim 176. (currently amended): Apparatus for the parallel processing of reaction mixtures, comprising

5 a reactor block having a series of wells therein extending down from an upper surface of the block for containing the reaction mixtures,

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an upper plate removably secured to said reactor block over said upper surface thereof, said upper plate having openings therein in registry with the wells in the reactor block,

removable liners in the wells for containing said reaction  
10 mixtures,

stirring mechanisms attached to said upper plate and  
removable with the upper plate for stirring said reaction  
mixtures, said stirring mechanisms extending down through the  
openings in the upper plate and into respective wells, and

15 seals for sealing against leakage through said upper plate  
openings when the upper plate is secured to the reactor block,

each stirring mechanism comprising a drive mounted on said  
upper plate and a multi-piece spindle rotatable by said drive,  
said multi-piece spindle having a metal upper spindle portion, a

20 plastic stirrer, and a coupling for releasably coupling the  
plastic stirrer to the metal upper spindle portion in a position  
wherein the stirrer extends down into a respective well, said  
plastic stirrer being removable from said coupling after a  
mixing operation to permit replacement of the stirrer.

Claim 177. (currently amended): An apparatus for parallel  
processing of reaction mixtures comprising:

73 a reactor block having a series of wells therein extending  
from an exterior surface of the block for containing the  
5 reaction mixtures,

33 a removable plate removably secured to the reactor block  
~~face to face with said exterior surface thereof~~, the removable  
plate having openings therein in registry with the wells in the  
reactor block,

10 ~~removable liners in the wells for containing the reaction~~  
~~mixtures,~~

a temperature control system for regulating the temperature  
of the reaction mixtures, and

15 a stirring system attached to the removable plate and  
removable with the removable plate for agitating the reaction  
mixtures, the stirring system comprising:

spindles extending into respective wells, each of the  
spindles having a first end portion and a second end portion,  
a stirring blade attached to the first end portion of each  
20 of the spindles, and

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a drive mechanism located external to the vessels that is  
adapted to rotate the spindles.

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Claim 178. (currently amended): The apparatus of claim  
177208 wherein said exterior surface of the reactor block is an  
upper surface, and wherein said removable plate is an upper  
plate overlying said upper surface.

Claim 179. (currently amended): A parallel reactor for  
simultaneously processing a plurality of reaction mixtures, said  
reactor comprising

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vessels for containing the reaction mixtures,  
multi-piece spindles for stirring the reaction mixtures in  
the vessels, each multi-piece spindle comprising a metal upper  
spindle portion, a plastic stirrer comprising a plastic shaft  
and a plastic mixing blade on the shaft, and a coupling for  
releasably coupling the plastic stirrer to the metal upper  
10 spindle portion in a position wherein the stirrer extends down  
into a respective vessel, said plastic stirrer being removable  
from said upper spindle portion after a mixing operation to  
permit replacement of the stirrer, and

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a drive system for rotating the multi-piece spindles to mix  
the contents of the vessels, said drive system comprising a  
drive mechanism located external to the vessels, and magnetic  
feed through devices for magnetically coupling the drive  
mechanism to the upper spindle portions of the multi-piece  
spindles, each upper spindle portion comprising a leg extending  
20 down from a respective magnetic feed through device.

Claim 180. (previously added): A parallel reactor as set forth in claim 179 wherein said magnetic feed through device comprises a magnetic driver rotatable by said drive mechanism, and a magnetic follower adapted to be magnetically rotated upon rotation of the magnetic driver, said leg comprising an integral extension of said magnetic follower.

Claim 181. (previously added): A parallel reactor as set forth in claim 179 wherein said drive mechanism comprises a gear train for rotating each magnetic feed through device, and a motor for rotating gears of the gear train to effect rotation of the multi-piece spindles at speeds up to 3000 rpm.

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Claim 182. (previously added): A parallel reactor as set forth in claim 181 wherein each vessel has a volume of less than about 500 ml.

Claim 183. (currently amended): A parallel reactor for simultaneously processing a plurality of reaction mixtures, said reactor comprising

vessels for containing the reaction mixtures, and  
5 plastic stirrers comprising a plastic shaft and a plastic mixing blade on the shaft for stirring the reaction mixtures in the vessels,

a drive system for moving the stirrers to mix the contents of the vessels, and

10 a coupling for releasably connecting each stirrer to the drive system in a position wherein the stirrer extends down into a respective vessel,

said plastic stirrer being removable from said coupling to permit replacement of the stirrer.

Claim 184. (currently amended): A parallel reactor as set forth in claim 183 wherein said stirrer is of a chemically resistant plastic material ~~and comprises a shaft and a mixing blade on the shaft.~~

Claim 185. (previously added): A parallel reactor as set forth in claim 184 wherein said shaft of the stirrer has a quick-connect/disconnect element thereon adapted for releasable engagement with said coupling.

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Claim 186. (previously added): A parallel reactor as set forth in claim 185 wherein said quick-connect/disconnect element comprises a circumferential groove around said shaft for receiving one or more detents in the coupling.

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Claim 187. (previously added): A parallel reactor as set forth in claim 183 wherein said drive system comprises a drive mechanism located external to the vessels, and magnetic feed through devices driven by said drive mechanism for rotating the  
5 stirrers.

Claim 188. (previously added): A parallel reactor as set forth in claim 187 wherein said coupling is attached to a leg extending down from a respective magnetic feed through device.

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Claim 189. (previously added): A parallel reactor as set forth in claim 188 wherein said magnetic feed through device comprises a magnetic driver rotatable by said drive mechanism, and a magnetic follower adapted to be magnetically rotated upon  
5 rotation of the magnetic driver, said leg comprising an integral extension of said magnetic follower.

Claim 190. (previously added): A parallel reactor as set forth in claim 187 wherein said drive mechanism comprises a gear train for rotating each magnetic feed through device, and a motor for rotating gears of the gear train to effect rotation of the magnetic feed through devices and stirrers.

Claim 191. (previously added): A parallel reactor as set forth in claim 183 wherein said drive system comprises a gear train drivingly connected to each of said stirrers, and a motor for rotating gears of the gear train to effect movement of the stirrers.

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Claim 192. (previously added): A parallel reactor as set forth in claim 183 wherein each vessel has a volume of less than about 500 ml.

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Claim 193. (currently amended): Plastic stirrers for use in stirring reaction mixtures in a parallel reactor, said reactor comprising vessels for containing said reaction mixtures, a drive system for moving the stirrers to mix the contents of the vessels, and couplings for releasably connecting the plastic stirrers to the drive system in positions wherein the stirrers extend down into the vessels, each plastic stirrer comprising a plastic shaft and a plastic mixing blade on the shaft, said shaft having a quick-connect/disconnect element thereon adapted for engagement with said coupling for releasably connecting the plastic stirrer to the drive system whereby upon completion of a mixing operation the plastic stirrer is adapted to be disconnected from said coupling and replaced by a new plastic stirrer.



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Claim 194. (previously added): Plastic stirrers as set forth in claim 193 wherein said quick-connect/disconnect element comprises a circumferential groove in said shaft adapted for receiving one or more detents in the coupling.

Claim 195. (previously added): Plastic stirrers as set forth in claim 193 wherein each stirrer is sized for reception in a vessel having a volume of less than 500 ml.

Claim 196. (previously added): Plastic stirrers as set forth in claim 193 wherein each stirrer is sized for reception in a vessel having a volume of less than 20 ml.

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Claim 197. (previously added): A combinatorial chemistry reactor system for parallel processing of reaction mixtures, said system comprising

5 a reactor block having a series of wells therein for holding said reaction mixtures,

a removable plate removably secured to the reactor block, the removable plate having openings therein in registry with the wells in the reactor block,

10 seals for sealing the wells of the reactor block to allow said reaction mixtures to react under pressure when the removable plate is secured to the reactor block, and

a stirring system supported by the removable plate and removable with the removable plate for agitating the reaction mixtures, the stirring system comprising

15 stirrers extending into respective wells, and

a drive mechanism located external to the wells for moving the stirrers to agitate reaction mixtures in the wells.

Claim 198. (previously added): A system as set forth in claim 197 wherein said drive mechanism comprises a drive train

for driving said stirrers, and a motor for driving the drive train.

Claim 199. (previously added): A system as set forth in claim 198 wherein said drive train comprises a plurality of drive gears in mesh with one another and a motor for driving said drive gears.

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Claim 200. (previously added): A system as set forth in claim 197 wherein said drive mechanism comprises a plurality of drive gears on the stirrers, and one or more motors for driving said drive gears.

Claim 201. (previously added): A system as set forth in claim 200 wherein said drive gears are in mesh and driven by a single motor.

Claim 202. (previously added): A system as set forth in claim 197 wherein said stirrers are removably attached to said drive mechanism.

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Claim 203. (previously added): A system as set forth in claim 197 wherein said stirrers are of a non-metal chemically resistant material.

Claim 204. (previously added): A system as set forth in claim 203 wherein said stirrers are of a polymer material.

Claim 205. (previously added): A system as set forth in claim 197 further comprising fasteners for removably fastening said removable plate in face-to-face relation with an upper surface of said reactor block.

Claim 206. (previously added): A combinatorial chemistry reactor system for parallel processing of reaction mixtures, said system comprising

5 a reactor block having a series of wells therein extending down from an upper surface of the block, said wells holding said reaction mixtures,

5031 an upper plate removably secured to the reactor block in face-to-face relation with said upper surface, the removable plate having openings therein in registry with the wells in the  
10 reactor block,

seals for sealing the wells of the reactor block to allow said reaction mixtures to react under pressure when the removable plate is secured to the reactor block, and

15 a stirring system supported by the removable plate and removable with the removable plate for agitating the reaction mixtures, the stirring system comprising

stirrers extending into respective wells, and

20 a drive mechanism located external to the wells for moving the stirrers to agitate reaction mixtures in the wells, said drive mechanism comprising a drive train for driving said stirrers and one or more motors for driving said drive train, said stirrers being removably attached to said drive mechanism.

28 Claim 207. (new): The apparatus of claim 177 further comprising removable liners in the wells.

28 Claim 208. (new): The apparatus of claim 177 wherein said removable plate is removably secured face-to-face with said exterior surface of the reactor block.

5031 Claim 209. (new): A parallel reactor as set forth in claim 183 wherein said vessels comprise a series of wells extending from an exterior surface of a reactor block, said reactor

further comprising a removable liner in each of the wells,

5 wherein each of said plastic stirrers extends into a respective liner.

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Claim 210. (new): A parallel reactor as set forth in claim 183 wherein said plastic stirrers are disposable.